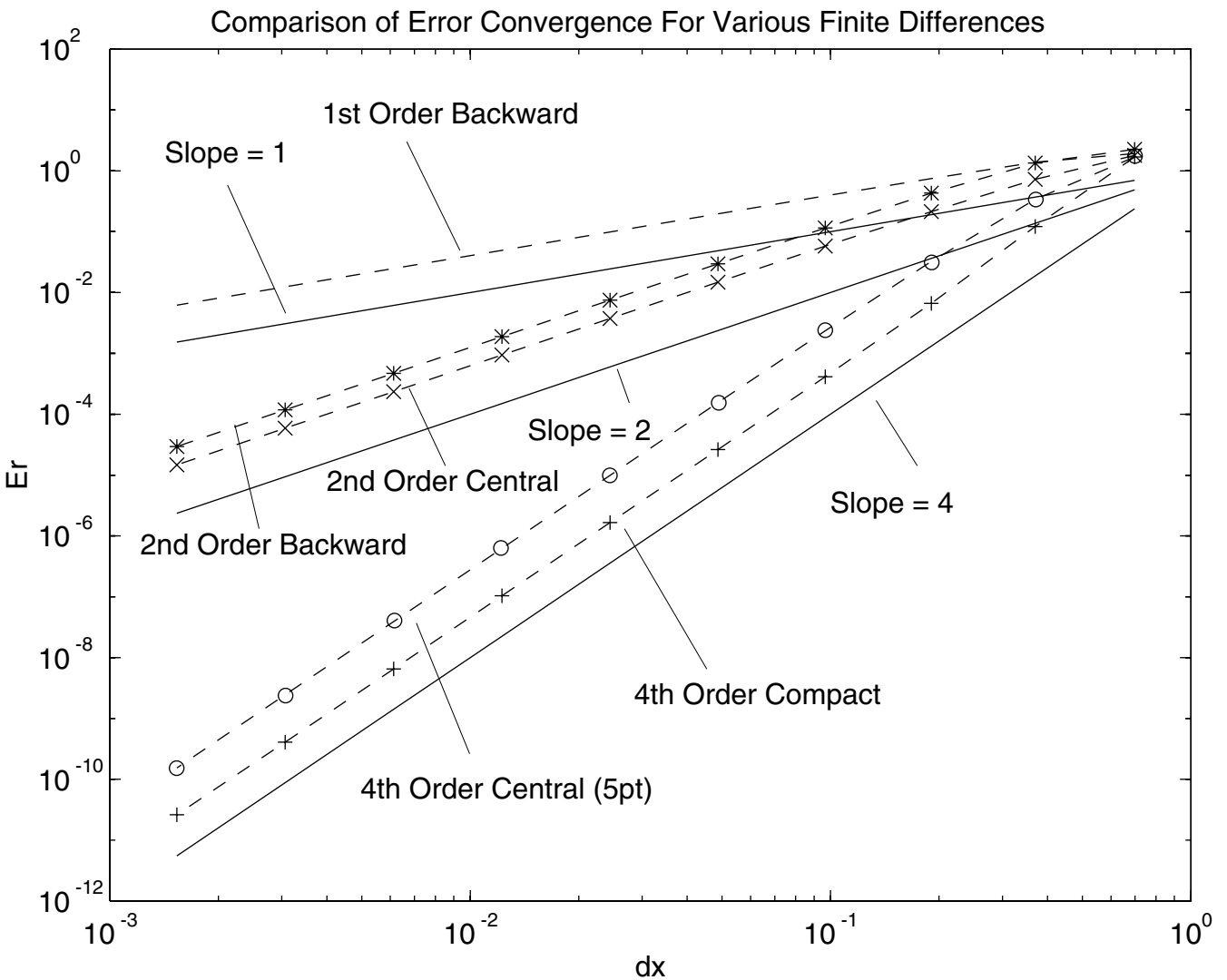

Given a function u(x), various finite difference approximations to the first derivative are compared with the exact first derivative. Error is defined as the max norm of the difference between the finite difference approximation and the exact derivative. A mesh refinement (doubling the number of points, halving dx) is compared in the figure. A first order scheme should converge to a linear curve with slope 1, second order to slope 2, and fourth order to slope 4 in a log-log plot.